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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/737,277

12/16/2003

Masayoshi Omura

17317

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EXAMINER

ROSENAU, DEREK JOHN

ART UNIT

PAPER NUMBER

2834

MAIL DATE

DELIVERY MODE

11/29/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/737,277

Applicant(s)

OMURA ET AL.

Examiner

Derek J. Rosenau

Art Unit

2834

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 4,5 and 9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 4,5 and 9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 4, 5 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kami et al. (US 5176140) in view of Kinoshita et al. (US 5722644), Erikson (US 4281550), and Dam et al. (US 6781287).

3. With respect to claim 9, Kami et al. discloses an ultrasonic probe for an endoscope (Fig 35) comprising an ultrasonic transducer, the ultrasonic transducer further comprising, by sequential lamination: an acoustic lens (item 71); an acoustic matching layer (item 62); a piezoelectric element (item 61); a backing member (item 63) that attenuates ultrasonic waves (column 14, lines 10-13), and an exterior cap which immerses the ultrasonic transducer in an acoustic medium (column 27, lines 47-55)

Kami et al. does not disclose expressly that the backing (damping layer) comprises a synthetic rubber having a mixture including acrylonitrile-butadiene rubber, ethylene-propylene terpolymer, and at least inorganic fine powders; or displays 1) a hardness property of between 80 and 100 degrees in the A scale in conformity with JISK6253, and 2) an ultrasonic absorbing coefficient of 10 dB/mm or more at a frequency of 5 MHz; or an exterior cap assembly that covers the ultrasonic transducer and contains an acoustic medium comprising an aqueous solution that immerses the

ultrasonic transducer and imposes a low attenuation on ultrasonic waves arriving at a surface of the ultrasonic transducer, which aqueous solution is obtained by adding an additive to the water, or oil that displays low attenuation to ultrasonic waves, wherein upon immersion of the ultrasonic transducer in the aqueous solution, the backing member displays 1) a percentage of absorption that is 2.5% or less and 2) an acoustic impedance that is within the range of 1×10^6 to 8×10^6 kg/(m²s).

Kinoshita et al. teaches that is well known to form a vibration-damping material of a mixture that includes acrylonitrile-butadiene rubber, ethylene-propylene terpolymer, and at least inorganic fine powders (column 1, line 65 through column 2, line 17).

None of Kami et al., Kinoshita et al., Erikson, and Dam et al. discloses expressly that the backing member displays 1) a hardness property of 80 to 100 degrees in the A scale in conformity with JISK6253 and 2) an ultrasonic absorbing coefficient of 10 dB/mm or more at a frequency of 5 MHz, or that upon immersion of the ultrasonic transducer in the aqueous solution, the backing member displays 1) a percentage of absorption that is 2.5% or less and 2) an acoustic impedance that is within a range of 1×10^6 to 8×10^6 kg/(m²s). However, it has been held that it is obvious to discover optimum or workable ranges by routine experimentation so long as the general conditions of the claim are shown (*In re Aller*, 105 USPQ 233). As Kinoshita et al. discloses the constituent materials of the claimed synthetic rubber (the general conditions of the claimed structure), it would have been obvious to use a material with a hardness of 80 to 100 degrees in the A scale in conformity with JISK6253, an absorbing coefficient of 10 dB/mm or more at a frequency of 5 MHz, a percentage of absorption of

2.5% or less upon immersion of the ultrasonic transducer in the aqueous solution, and an acoustic impedance of 1×10^6 to 8×10^6 kg/(m²s) upon immersion of the ultrasonic transducer in the aqueous solution, as these material properties could be achieved through routine experimentation.

Erikson teaches an ultrasonic probe in which an exterior cap (item 204) immerses the transducer in an acoustic medium of oil (column 3, lines 54-57).

Dam et al. teaches an ultrasonic probe in which an exterior cap (item 32) immerses the transducer in an acoustic medium of oil (item 33), and also teaches that oil displays a low attenuation to ultrasonic waves (column 3, lines 27-31).

At the time of invention, it would have been obvious to a person of ordinary skill in the art to combine the vibration-damping material of Kinoshita et al. and the acoustic medium of Erikson and Dam et al. with the ultrasonic transducer of Kami et al. for the benefits of the self-adhesive properties of the material (column 1, lines 65-67 of Kinoshita et al.) and using an acoustic medium using a material that is matched to the ultrasound transmissive properties of the human body (column 3, lines 54-57 of Erikson).

4. With respect to claim 4, the combination of Kami et al., Kinoshita et al., Erikson, and Dam et al. discloses an ultrasonic probe according to claim 9. Kami et al. discloses a flexible shaft which rotates the ultrasonic transducer using a driving motor (column 27, lines 47-63).

5. With respect to claim 5, the combination of Kami et al., Kinoshita et al., Erikson, and Dam et al. discloses an ultrasonic probe according to claim 9. Kami et al. discloses

a coating film (Fig 1, item 103), which covers the ultrasonic transducer to protect it from the acoustic medium.

Response to Arguments

6. Applicant's arguments filed 25 October 2007 have been fully considered but they are not persuasive. Applicant argues that the application of *In re Aller* in the obviousness rejections is incorrect, as the Kinoshita reference does not disclose the general conditions of claim 9. However, the general conditions are disclosed by Kinoshita, as Kinoshita discloses a vibration-damping material having a mixture of the claimed rubber materials. Therefore, at the time of invention, it would have been obvious to a person of ordinary skill in the art to modify this mixture by routine experimentation in order to find the optimum mixture for its intended use. In doing so, one of ordinary skill in the art would arrive at a mixture having the hardness, ultrasonic absorbing coefficient, percentage of absorption, and acoustic impedance in the claimed ranges. Applicant argues that the invention of claim 9 could not be obtained by routine experimentation. However, the hardness, ultrasonic absorbing coefficient, percentage of absorption, and acoustic impedance are all inherent properties of the material, with the material being a mixture of NBR, EPDM, and inorganic fine powders. It would require only routine experimentation to adjust the relative compositions of each of these materials to achieve the optimum values for the desired application.

Conclusion

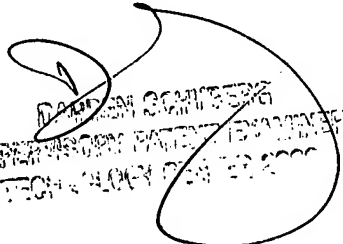
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Derek J. Rosenau whose telephone number is 571-272-8932. The examiner can normally be reached on Monday thru Thursday 7:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Darren Schuberg can be reached on 571-272-2044. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Derek J Rosenau
Examiner
Art Unit 2834

DJR
11/15/2007


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